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THE AGRICULTURAL SITUATION FOR 1918

A SERIES OF STATEMENTS PREPARED UNDER THE
DIRECTION OF THE SECRETARY OF AGRICULTURE

PART VIII

CORN

A LARGE ACREAGE OF CORN NEEDED



CONTENTS

	Page		Page
Importance of corn.....	3	Increasing production by better seed	9
World's acreage and distribution....	3	Increasing production by other	
Disposal of the crop.....	4	methods	11
Increasing the acreage.....	5	Insect enemies	12
Increasing the acre yield.....	7	Other enemies of corn.....	13
		Utilizing the crop.....	13

WHEAT EXCEPTED, corn is the most valuable and indispensable of the world's grain crops. It holds a commanding position in the agriculture of the United States. Its vast acreage and heavy yields are responsible to no small extent for the success of agriculture. The Department of Agriculture, in its program issued early in February, which re-emphasized and amplified the food production program for 1918 published by the Department in August, 1917, recommended that an acreage of corn approximately equal to that of 1917, which was the largest on record, should be planted in 1918, with possibly slight reductions in certain sections to free areas for spring wheat. In 1917 the acreage devoted to corn was approximately 119,755,000 acres, compared with 105,672,000 acres, the average for 1911-15, and with 107,083,000 acres for 1912 and 106,197,000 acres for 1915.

The record production of 1917 was made because of the great acreage which the crop occupied rather than because of the large yield per acre obtained. Unusually unfavorable weather prevailed over the corn-growing sections and the corn damaged by frost last fall is estimated by the Bureau of Crop Estimates to be in excess of 20 per cent of the total production, and about 43 per cent of the production of the States of Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas, where the injury was greatest.

The most advantageous utilization of this soft corn has received much consideration from the Department of Agriculture, State agricultural colleges and experiment stations, and other agencies. Among the measures advocated early in the fall were the making of the crop into silage, immediate feeding in the fields to cattle and hogs, preservation of the better corn through storage in well-ventilated cribs and salting the ears at the rate of 8 quarts of salt to 40 bushels of ears, manufacture of glucose, and distillation of industrial alcohol.

Because of the shortage of desirable seed corn, caused by the freezing of immature ears, the Department of Agriculture and various other agencies of the Federal and State Governments urged prompt husking and curing of such corn as might be suitable for seed, and in a number of other ways have assisted farmers to secure seed for the 1918 crop.

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CONTENTS.

	Page.		Page.
Importance of corn.....	3	Increasing production by better seed.....	9
World's acreage and distribution.....	3	Increasing production by other methods....	11
Disposal of the crop.....	4	Insect enemies	12
Increasing the acreage.....	5	Other enemies of corn	13
Increasing the acre yield.....	7	Utilizing the crop.....	13

IMPORTANCE OF CORN.

CORN, the last of the great cereals to be discovered, is now grown over a broader extent of the earth's surface than any other grain, except wheat. Originally merely the primitive food grain of the aborigines of tropical and semitropical regions of the Western Hemisphere, its cultivation within a few centuries has extended to all Continents; the exceptional productivity of the plant, in both grain and stover, and the manifold uses made of grain, stalk, pith, leaves, and cob have won for it the fame of being America's most valuable contribution to agriculture.

Because of its ability to make a maximum of growth in a minimum of time as compared with other cereals, its many distinct types, its great range of variability, and its many uses, corn occupies a unique place in the world's agriculture. Wheat excepted, corn is the most valuable and indispensable of the world's grain crops.

WORLD'S ACREAGE AND DISTRIBUTION.

The world's area annually planted to corn normally averages about 175,000,000 acres. Approximately 40,000,000 acres are planted in the Eastern Hemisphere, where the principal corn-growing areas are Southern Europe, Asia, the Mediterranean countries of Africa, and the Union of South Africa. Among the countries of Europe, the greatest acreages are in Austria-Hungary, Italy, the Balkan States, and Russia. A much less extensive acreage is grown in Spain and France. In Asia, British India, Turkey, and Southern Asiatic Russia have the most extensive acreages; the crop is grown less extensively in the Philippines, China, and Japan. Practically all of the African acreage is in Egypt, the Union of South Africa, and Algeria. Australasia contributes comparatively little to the world's corn acreage.

Of the 135,000,000 acres planted to corn in the Western Hemisphere, 105,000,000, or three-fifths of the total world's acreage, is in the United

States. Next to the United States, Mexico and Argentina have the greatest acreages. The crop is grown extensively in the smaller countries of South America and of Central America and less extensively in portions of Canada.

Argentina is the leading corn-producing country of South America. Its annual yield approximately is 250,000,000 bushels. More than half the Argentine crop is exported, so that, considering its production, it does not rank high as a corn-consuming nation. The smaller countries of South America consume about all the corn they produce, for it holds an important place in the dietary of the native population, especially in Peru, Bolivia, and Ecuador.

In Mexico, corn, in one form or another, is the staple article of diet of most of the population. So great is the demand, that although in normal times Mexico ranks second to the United States in acreage and total yield, its production is insufficient for home consumption, and several million bushels are imported annually from the United States. In a large part of Mexico corn is the most important agricultural crop and in some sections two crops a year are grown. Many distinct types having characters that adapt them apparently to certain peculiar environments have developed in Mexico.

In the United States, corn is grown more widely than any other crop. It is grown to some extent in every State in the Union. The acreage in the United States usually exceeds the combined acreages of wheat, oats, barley, rye, buckwheat, and rice. Annual production ranges from 2,500,000,000 to 3,000,000,000 bushels, or slightly exceeding the combined yields of the cereals just mentioned. The value is far in excess of any other crop. With the possible exception of cotton, corn is the most important and irreplaceable crop in the agriculture of this country.

DISPOSAL OF THE CROP.

Approximately 85 per cent of the corn crop of the United States is consumed upon the farm. One and one-half to 2½ per cent is exported and the remainder is used in manufacture or otherwise consumed. During the last 10 years the demand for corn has increased and at times the supply has been inadequate to meet it. This has led to the importation of corn from Argentina. While the amount imported has reached in some years a total of something more than 7,000,000 bushels, it is so small in comparison with the production in this country that corn imports are not an important factor in the corn trade.

However, this importation does call attention to the need of increasing the corn production in this country. But a much more urgent reason for increasing production is the absolute need of more food grains in the present world crisis. In 1917 the acreage planted to corn

was the largest in the history of the country, nearly 120,000,000 acres, and exceeding the 1916 planting by about 15 per cent. The production is estimated at 3,159,494,000 bushels, the largest crop ever harvested. (See Table No. 1.) There seems to be every reason to believe that our own welfare and that of the Allies in the World's War, as well as of neutral nations, will make desirable an even greater production of corn in 1918 on an acreage approximately equal to that planted in 1917.

INCREASING THE ACREAGE.

Increased production may be accomplished by increasing the acreage. Acreage may be increased either by bringing new lands into cultivation or, if land is available and labor short, through the adoption of labor-saving machinery.

The clearing and bringing into cultivation of waste lands, woodlands, and cutover lands, and the draining of lands where the water table is now too near the surface to permit successful corn growing, would require more man labor. At this time it is perhaps as well not to advise increasing the acreage by such methods. The feasibility of increasing production by the utilization of such lands will have to be determined very largely by local conditions as to labor supply and relative prices.

The more extensive use of labor-saving implements will make it easier in 1918 to approximate the record-breaking acreage of 1917, especially when employed in sections where corn is now grown profitably but on a more limited scale than is desirable because present methods require a large amount of man labor. The more general use of recently developed and improved tractors that are adapted to the uses of the small farm as well as the large farm would tend to increase the acreage and to effect a saving in labor. The use of larger plows, harrows, and other implements used in fitting the land would make it possible to accomplish more work per man. Similarly the substitution of two-row plant-

TABLE 1.—Acreage, production, and farm value of corn in the United States, 1904-1917.

Year.	Acreage.	Average yield per acre.	Produc- tion.	Average farm price Dec. 1.	Farm value Dec 1.	
					Total.	Per acre.
	<i>Acres.</i>	<i>Bushels.</i>	<i>Bushels.</i>	<i>Cents.</i>	<i>Dollars.</i>	<i>Dollars.</i>
Annual average:						
1904-1908	96,940,000	27.6	2,672,772,000	47.3	1,264,766,000	13.05
1909-1913	104,229,000	26.0	2,708,334,000	56.4	1,527,969,000	14.66
1914	103,435,000	25.8	2,672,804,000	64.4	1,722,070,000	16.65
1915	106,197,000	28.2	2,994,793,000	57.5	1,722,680,000	16.22
1916	105,296,000	24.4	2,566,927,000	88.9	2,280,729,000	21.66
1917	119,755,000	26.4	3,159,494,000	128.3	4,053,672,000	33.85

ers and two-row and double cultivators in place of smaller and less efficient implements would make it possible to do the same amount of work with less expenditure of labor.

In some corn-growing sections it is the practice to replant missing hills as soon as the corn is up to a stand. Frequently this is done by dropping kernels by hand and covering with a hoe. A labor-saving and quicker method would be the use of small hand planters. These could be used to advantage for the first planting also in sections where comparatively small areas are planted and where it is at present the custom to drop the corn by hand and cover with the hoe.

It is the practice in some localities to plant a much larger number of kernels than the number of stalks desired and to thin to the desired stand when the corn plants are about 6 to 8 inches tall. This method may be satisfactory where plenty of labor is available, but where it is desirable to economize labor it would be advisable to plant tested seed at about the same rate as the stand desired and do no thinning.

A more general use of efficient harvesting machinery would permit a more economical use of labor. A corn binder with an attachment for elevating the bundles of corn into a wagon should be used much more extensively than it is for harvesting ensilage corn. There is also on the market a machine that converts the corn into ensilage in the field, elevating it into a wagon, from which it is sucked or lifted into the silo. The use of either of these machines, especially the latter, would do away with the necessity of much laborious work.

A large percentage of the cutting and shocking of corn is done by hand labor. In some sections, because of unfavorable topography or other reasons, it is not practicable to use machine cutters. However, the greater part of the corn that is now cut by hand labor could be harvested by machinery, economizing labor and doing the work in a less laborious manner.

Much of the corn that is now husked from the shocks could be handled more economically and with a saving in feed value of stover by substituting machine huskers and shredders for hand labor. The use of corn pickers would accomplish similar results in the case of corn husked from the standing stalks. Unloading and elevating machinery at the crib should be introduced and more generally used in many sections where it is now unknown or not commonly used. Where such facilities are not available cribs should be constructed in such a manner that they can be filled and emptied with the least possible labor. For level ground double cribs with an elevated driveway and approaches that will enable the loads to be driven through the cribs and dumped or scooped out of the wagons without any high pitching are very satisfactory.

INCREASING THE ACRE YIELD.

The use of more efficient implements will increase total production, not only by increasing acreage, but also by increasing acre yields.

Yields per acre may be increased by better methods of tilling the ground and better methods of cultivating the crop. Any general advice as to better methods of tillage must be modified to meet specific conditions, as methods found valuable in some localities may be of less value or even detrimental in other localities. As general advice the following suggestions are valuable and properly applied will lead to increased acre yields.

Land is plowed in order to loosen it and enable water to enter in greater quantity, be absorbed to greater depth, and remain longer in the soil.

A deep seed bed well supplied with soil moisture and well drained makes a big corn yield possible, whether the summer proves "too dry" or "too wet."

If not well plowed, some lands are so impervious that during several weeks of rainy weather they remain dry below a depth of 5 or 10 inches.

In many localities it is best to plow in the fall, or several months before planting, in order to enable the soil to store a sufficient amount of water to produce a corn crop. In some localities, however, it is necessary to grow rye or some other crop on fall-plowed land, to prevent erosion.

Heavy cover crops should be turned under in the fall, winter, or very early spring, in order to give time for decay before corn is planted on the land.

Land should never be plowed when too wet to pulverize finely. In the fall, plowing may be done even when the ground is too dry, as winter rains and freezing will pulverize the clods.

If plowing is done in the spring shortly before planting time, it is necessary that the soil be in proper condition to pulverize readily.

Spring-plowed land should be harrowed the same day it is plowed.

Disking land in the spring before plowing is a great advantage. It retains moisture and keeps the land longer in a good plowing condition. It also pulverizes the surface portion of the furrow slice before it is turned under out of reach of the harrow.

When the soil is loose to a sufficient depth, corn roots penetrate in abundance to a depth of 3 or 4 feet.

The growing of clover and deep-rooted plants is profitably practiced with most soils, and subsoiling is profitably practiced with some soils to increase their water-absorbing capacity and to enable the corn roots to use the soil to greater depths.

Large plows and plenty of power will facilitate this thorough preparation of the seed bed.

On many heavy clay soils the yield of corn per acre depends largely upon the thoroughness of the plowing.

It is necessary to loosen all the land and leave no large air spaces. To "cut and cover" is not good practice.

A pasture field was plowed in alternate strips by two men, one a careful plowman and the other a poor plowman. The poorly plowed strips showed poorer corn all through the summer and produced 20 bushels less corn to the acre than the well-plowed strips. The careless plowman allowed the plow to "cut and cover" in places, leaving hard spots where the plow did not loosen the land and large air spaces where the overturned sod buckled and did not come in contact with the subsoil. Hills of corn growing on hard spots or over large air spaces usually produce poorly.

Where a heavy growth of clover or weeds or a heavy application of manure was plowed under in the fall, the land should be given, just previous to planting, a cultivation as deep as it was plowed. This deep cultivation mixes the humus throughout the soil and is of more value than any other cultivation the corn crop can receive. It is economical, because wider cultivators and more horses can be employed than after the corn is planted.

In many sections better methods of tillage will involve the use of commercial fertilizers to supply such elements of plant food as can not be supplied by the soil or by cropping systems in sufficient quantities for the greatest profit. Usually it is desirable to supply nitrogen, phosphoric acid, and potash in proportions varying with the soil and the general cropping system. The advice of State experiment stations and county agricultural agents should be obtained regarding formulas and amounts to be used.

The most successful corn growers realize the importance of thorough early cultivations, which prevent any check in the growth of the plants due to weeds or crusted soil. From the time of germination to the maturing of the corn the farmer should see that the plants are not subjected to any preventable unfavorable conditions, but are permitted to make a steady, vigorous growth.

Horse weeders and harrows should be used when needed to break a surface crust, check insect depredations, or kill young weeds that start before the corn is up or large enough to be worked with other implements. For the first cultivation after the plants are up, and while they are very small, narrow shovels that throw the soil very little should be used, and fenders usually are desirable to prevent the covering of the plants.

After the plants have reached a height of 2 or 3 feet, the soil, even in the middle of the rows, should not be cultivated deeper than 4 inches,

and usually a shallower cultivation will prove better. For retaining soil moisture a loose soil mulch 2 or 3 inches in thickness should be maintained.

Corn should be cultivated often enough to keep down weeds and to maintain constantly a loose soil mulch until the corn has attained its growth. To this end a greater number of cultivations will be necessary when rains at intervals of about a week cause the surface soil to run together and crust. This crust must be broken and the soil mulch restored, or evaporation will soon rob the soil of its moisture. It is a mistake to think that the longer the drought the more frequent should be the cultivations. After a fine mulch about 3 inches in depth has been produced its frequent stirring is not necessary, except as it is required to keep weeds from starting. The essential object of cultivation is to restore the soil mulch as soon after a rain as the condition of the ground will permit. Thorough cultivation as compared with lack of cultivation frequently means the difference between a good yield and no yield.

INCREASING PRODUCTION BY BETTER SEED.

There is each spring a scarcity of good seed corn. This condition is all the more regrettable, because it need not exist; and it is much more serious than commonly supposed, because many do not realize fully the tremendous loss to themselves and the country due to the planting of inferior seed. A full stand of plants may be obtained from inferior seed, but the yield will not be the best possible. The loss is due to delay or negligence. It can be prevented by the selection of seed corn in the autumn.

To be first class, seed must be:

(1) Of a variety well adapted to the seasonal and soil conditions where it is to be planted.

(2) Grown on productive plants of a productive variety, showing all the desirable characteristics.

(3) Well matured, and preserved from ripening time till planting time in such a manner as to retain its full vigor.

The importance of the three requirements just enumerated has been demonstrated experimentally. The results of the tests, given briefly, are as follows:

(1) For a series of five years, 12 varieties were tested in 10 Northern States, equivalent lots of seed being used in each State. Varieties that produced most in some States were among the poorest in others.

(2) Seed ears taken from the highest-yielding rows of ear-to-row breeding plats have repeatedly produced better than seed ears taken from poorer yielding rows. Seed ears from the best-producing stalks found in a general field produced more than seed ears taken without

considering the productiveness of the parent stalks. As the result of selection work of this kind, average acre yields on some farms have been increased 18 per cent in a decade.

(3) Four bushels of ears were divided into two equal parts, one part being well taken care of and the other placed in a barn as corn is ordinarily cribbed. The well-preserved seed gave a yield on poor soil 12 per cent higher than the poorly-preserved and 27 per cent higher on fertile soil, notwithstanding the fact that both lots of seed germinated equally well.

Seed corn that matures normally and has been preserved properly will grow satisfactorily. It is very poor management to neglect proper preservation and then spend time in the spring separating by germination tests those ears that have been badly damaged from those that have been slightly damaged. Prevention is better than cure, and in this case a cure is impossible.

If it is found necessary to plant seed the vitality of which is at all doubtful, each ear should be tested separately and only those planted which germinate perfectly.

If the only seed available for planting is inferior in quality and vitality, it should be planted thick in order to counterbalance imperfect germination and to approximate perfect stands. Poor stands are a frequent source of poor yields. In nearly every locality good farmers usually agree regarding the stand that approximates the optimum for normal soil and seasonal conditions. Stands markedly inferior to the optimum give an increase in size of ears, but a decrease in total yield. Loss may be sustained from too thick a stand, which causes a decrease in size of ears and in total yields.

Autumn is the time to prepare for a profitable corn crop the following season. Dropping all other business at corn-ripening time and selecting, drying, and storing at least enough seed to meet the requirements of two years' planting will ensure a seed supply for the second succeeding year in the event of crop failure the first year. Selecting seed corn requires the corn grower's entire attention. If he will get the very best that is to be had and preserve it well, his increased yields will return him more profit than any other work he can do on his farm.

In 13 years' investigations conducted upon Scioto River bottom soil near Piketon, Ohio, with Woodburn White Dent, U. S. Selection 77, the yield was raised from an average of 63 bushels of dry shelled corn for the period from 1901 to 1907 to an average of 75 bushels for the period from 1907 to 1913. The principal influence producing this increase in yield was the selection and care of seed corn.

As soon as the crop ripens, the first step is to go through the field with seed-picking bags, and husk the ears from the stalks that have

produced the most corn without having had any special advantages as to space, moisture, or fertility. The large ears on stalks standing singly with an unusual amount of space around them should be avoided. Preference should be given the plants that have produced most heavily in competition with a full stand of less productive plants. In all localities the inherent tendency of the plant to produce heavily of sound, dry, shelled corn is of most importance.

The same day seed corn is gathered the husked ears should be put in a dry place with a free circulation of air and placed in such position that the ears do not touch each other. This is the only safe procedure. Good seed is repeatedly ruined because of the belief that it is already dry enough when gathered and that the precaution mentioned above is unnecessary.

In localities where weevils and grain moths injure stored grain, the thoroughly dry seed ears should be stored in very tight mouse-proof receptacles, with one pound of moth balls or naphthalene inclosed for each bushel of corn. This quantity tightly inclosed with the corn will prevent damage from these insects and will not injure the seed.

INCREASING PRODUCTION BY OTHER METHODS.

In many sections the corn production could be increased very largely by following early maturing crops such as garden peas, potatoes, various truck crops, early sweet corn, oats, barley, and various hay crops with corn. Where the growing season is long enough the corn could be allowed to ripen grain; where not long enough to permit maturity of grain the crop could be utilized as silage.

The pasturing of the standing corn by hogs, or the so-called "hogging off," could be practiced with advantage much more extensively than at present and in many instances would lead to corn being planted after other crops and in this way increase production with comparatively small increase in labor.

More than 7,000,000 acres of the corn crop is grown every year at the risk of being killed or greatly injured by freezing weather before it is mature. To some extent this danger could be lessened by the use of varieties that do not require so long a growing season. This would reduce but would not eliminate the danger, as the season may be so cool as to prevent the proper maturity of any variety or the freezes may occur so early as to endanger the earliest maturing. In such sections much of the crop should be put in the silo and would be equivalent to increased production. Even where frozen the crop can be made into ensilage and used with very little, if any, loss in feeding value. Otherwise handled, there is frequently serious loss in such corn. In addition to areas subject to early frosts there are areas on the Pacific Coast where, because of cool, moist conditions, our present varieties do not

mature thoroughly, but where varieties for ensilage could be grown advantageously to a much greater extent.

Annually extensive bottom land plantings are destroyed by floods. Usually the floods occur sufficiently early in the season to permit the flooded areas to be planted a second time to corn. Generally the same variety is used for the second planting, the crop matures late in the season, and not infrequently it is injured or killed by frosts, resulting in a large proportion of soft and damaged ears. In such instances the crop could be used most profitably by converting it into silage. If varieties requiring a shorter growing season were used for the second planting, matured grain yields would be secured more frequently. If the methods suggested were put into practice, increased production would result.

Droughts occurring at the time the corn is tasseling and silking frequently cut short the grain yield. Cutting the crop for silage under such conditions would be equivalent to increased production and would be gain where otherwise there would be loss.

INSECT ENEMIES.

More efficient methods of control and prevention of insect damage would tend to increase production. Prof. Hunt has stated that 214 species of insects are injurious to corn. Fortunately, however, comparatively few of these ordinarily cause serious losses. Those most serious to growing corn are wireworms, cutworms, white grubs, corn-root worms, corn-root webworms, corn-root louse, corn bill bugs, corn earworms, stalk borers, and chinch bugs.

Fall plowing and in some instances summer plowing, short systematic rotations, maintaining clean cultivation of the crop, and clean fence rows and field corners are perhaps the most effective general methods of combating insects injurious to corn. Poisoned baits, contact insecticides, trap crops, trap lanterns, and various forms of barrier traps such as dust mulch, dry ditch, coal tar, and road oil are efficacious methods of reducing or preventing damage from various insects. In all cases where there is danger of serious losses due to insect attacks, the farmer should communicate with his State entomologist and county agricultural adviser.

Insects that attack the grain in the field and in storage are the rice weevil, the angoumois grain moth, and certain rust-colored beetles frequently but incorrectly called weevils.

In sections where these insects are destructive to stored grain, cleanliness is of value in preventing injury. Small quantities of grain should not be left in the cribs during the summer, as they tend to harbor these pests. In localities where the weather is warm enough to permit these pests to work throughout the entire year, it is best to

construct the cribs so that they can be made practically air-tight and then to treat the crop with some insecticide such as carbon bisulphid. If this plan were thoroughly carried out the corn weevil could be practically exterminated.

Recent investigations have shown that an effective preventive of weevil damage and to a less extent of earworm damage is a tight-fitting shuck having a long extension beyond the end of the ear. In localities in the South where it is the custom to store the crop unhusked, much weevil damage could be prevented by a separate storage of the ears having protective shucks from the ears already infested with weevil or having loose shucks that permit of easy access to the grain. The latter type of ears should be the first to be fed or sold and the ears that have the protective type of husks could be retained, with assurance that they would be little if at all damaged by weevils.

OTHER ENEMIES OF CORN.

Chief among the other enemies of corn are perhaps the crow, black-bird, squirrels, and various types of rodents, and coons. Usually shooting, trapping, and poisoning are resorted to in combating these enemies. In the case of stored corn, galvanized wire cribs afford effective protection against rats, mice, and sparrows.

Wire netting of about one-fourth inch mesh also can be used successfully in the construction of frame cornercribs. This wire netting can be tacked to the inside of the uprights of the crib, and the strips which constitute the sides of the crib can also be nailed on the inside of the uprights, thus holding the wire netting in place. As a floor, which should be 18 inches or more from the ground, so as not to afford a hiding place for rats, the wire netting can be tacked to the sleepers and the flooring nailed over to hold the wire in place. For overhead protection the wire netting is simply tacked to the joists.

If cribs are built upon solid concrete foundations through which rats cannot burrow no netting will be needed, for the floor and the structure can be kept near the ground. With ample roof projection and upper ventilation no danger from dampness need be feared.

UTILIZING THE CROP.

In food production per acre, corn excels all other staple crops. In pounds of protein produced per acre it is exceeded only by soy beans and beans. The great stock feeding and dairy industries of the country are based largely upon the corn crop, as are also important manufacturing industries, such as starch, glucose, corn oil, and related products, various food products, and alcoholic beverages.

Corn is the great feed crop of the nation. Fed with legumes and grasses it is unequalled as an economical raw material for the pro-

duction of meat, milk, and butter. Because its high starch and oil content makes it primarily a fat-producing feed, corn is of almost inestimable value in finishing stock for market. The remarkable development of the pork industry in this country has been due to the high feed value and abundant yields of the corn crop. Of all types of stock feeding, the pork industry is associated most closely with the corn crop.

Of the 85 per cent of the crop consumed on the farm, all except a small percentage milled for human food is used for stock feeding. See table No. 2. The extent of the dependence of the feeding industry upon the corn yields is indicated by the fairly consistent relationship maintained between corn and live stock prices. See Circular No. 84, Part 1, Hogs: Hog production should be increased, page 11, for discussion of the relation of hog and corn prices. By far the greater part of the corn used in feeding is fed as ear corn, with the dry stalks and blades used as roughage, either as pasturage in the field or as cut stover. To a less extent the grain is fed in the form of shelled corn, milled products, and various manufactured feedstuffs. Another form in which corn is largely fed is silage. Silage, at present, is of more importance to the dairy industry than to the stock-feeding industry, but its use in fattening steers is increasing rapidly. Its most extensive use is found in the sections where dairying is a leading type of farming. While the silo has become a more or less familiar sight to almost every section where corn is grown, it is used most extensively in Wisconsin, Michigan, Indiana, Ohio, New York, and New England. It is used also largely in other States of the corn belt and in the Central Eastern States.

TABLE 2.—*Quantity of corn shipped out of producing counties and production of merchantable corn, for the United States, 1904-1916.*

(Million bushels.)

Year.	Crop.	Shipped out of county where grown.		Retained in county where grown.		Production of merchantable corn.	
		Amount.	Per cent of crop.	Amount.	Per cent of crop.	Amount.	Per cent of crop.
			Per cent.		Per cent.		Per cent.
Annual average:							
1904-1908	2,673	590	22.1	2,083	77.9	2,293	85.8
1909-1913	2,708	584	21.5	2,124	78.5	2,248	83.0
1914	2,673	498	18.6	2,175	81.4	2,260	84.5
1915	2,995	561	18.6	2,434	81.4	2,128	71.1
1916 <i>a</i>	2,281	401	17.6	1,880	82.4	1,916	84.0
1917	3,159						

NOTE.—The percentages were computed from original figures for bushels, before they were rounded to millions.

a 1916 figures, except for total crop, are subject to slight revision.

The origin of the cultivation of corn for human food among the aborigines of America is not a matter of record, but that the crop was of great importance to them is evidenced by many fanciful traditions and practices connected with its growing and harvesting. It rapidly came into cultivation and use among the early European settlers and soon became an indispensable crop, more than once averting starvation. In the United States today corn is used in various forms for human food. As corn meal it is used more generally among the descendants of the early European settlers than among those of more recent European origin. While the consumption of corn meal is greatest in the Southern States, it is consumed extensively in New England, New York, Pennsylvania, and Ohio, and to a less extent in various other States.

Among the common corn-meal dishes eaten in the South are hoe-cake, a mixture of corn meal and water with or without salt, cooked in a frying pan or griddle; corn bread or pone, made with the addition of baking powder or its equivalent and baked in the oven; griddle cakes, prepared from a thin batter with the addition of a leavening agent; egg or spoon bread, differing from ordinary corn bread in that eggs are used; and corn dumplings, usually cooked with either meat or vegetables. Corn meal is used in puddings, waffles, poultry dressing, meat, and fish dishes.

In the North, where corn products are consumed to a less extent, the preference is usually given to meal made from yellow corn, although the so-called hominy (grits) made from white corn is a common breakfast cereal. Hasty pudding (corn mush) and Johnny cake (corresponding to the hoe-cake of the South) have been made in New England households since colonial days. Indian pudding, a popular dessert prepared from corn meal, milk, and eggs, has long been regarded as one of the necessary adjuncts to the New England Thanksgiving dinner.

Other forms in which corn is consumed are grits, consisting of the hard portions of the kernels, but not milled so finely as meal, eaten as a breakfast cereal or as a side dish with meats; hominy, the same as grits but milled more coarsely; and lye hominy, or hulled corn, prepared from the whole grain after removal of the hull with caustic soda. The latter products are usually eaten as dinner dishes and serve largely to replace vegetables.

Corn is eaten also as a green vegetable. Ears are used for this purpose when they have reached what is known as the roasting ear stage or from the milk to the soft dough stage of growth. They are cooked by boiling or steaming and usually eaten from the cob. The canning of green corn is an important industry in certain portions of Maine, New York, Pennsylvania, Maryland, Ohio, Illinois, and Iowa. The sweet corn type, because of its higher sugar content and better flavor

and texture, is preferred for use as green corn both for immediate use and for canning.

Corn is used for human food in the form also of various breakfast cereals. Other human food products of corn are corn starch, used in the preparation of puddings and various forms of dessert; finely milled corn or corn flour, used to some extent in mixture with wheat flour; glucose table sirups; and corn oil.

The glucose is derived from corn starch, is mixed with a percentage of cane sugar to increase its sweetness and palatability, and is put on the market as corn sirup. The use of this sirup is increasing rapidly both for table purposes and for the manufacture of confectionery.

Corn oil is expressed from the germs of the corn. If refined sufficiently it is clear and without distinctive taste or odor. It is used as a salad oil and is an excellent cooking oil. Large quantities are shipped to olive oil manufacturing centers and used presumably to mix with olive oil. The use of corn oil both under its own name and otherwise is increasing greatly in this country and elsewhere.

Various beverages, alcoholic and non-alcoholic, and vinegar are among the other products derived from corn.

Aside from its direct uses for stock food and for human food, corn is the raw material from which numerous products are manufactured. These products include articles both suitable and not suitable for food purposes. About 30 products are listed under the following classification:

Starch Products:

Corn starch (for table use).
 Pearl starch.
 Gloss starch.
 Laundry starch.
 Dextrin (used in making glue, paste,
 and mucilage).
 Sugars (various grades).
 Sirups.

Mill products:

Hominy grits.
 Corn meal.
 Corn flour.
 Corn flakes.

Cellulose products:

Paper stock (various grades).
 Cellulose.
 Gelatin.
 Viscose.
 Pyroxyline.
 Amyloid.

The cellulose products are used in the manufacture of such articles as celluloid, collodion, sizing and surfacing preparations, varnishes, transparent films, carbon filaments for incandescent lights, artificial silk, guncotton, smokeless powder, etc.

Miscellaneous products:

Alcohol.
 Whiskey.
 Molasses.
 Charcoal.
 Dyestuff.
 Oxalic Acid.
 Proligneous acid.

Corn oil (used in the manufacture of soap and paint, and for culinary purposes).

Rubber (by vulcanizing corn oil).
 Corn cob pipes.

By-products:

Oil cake meal.
 Gluten feed.
 Hominy feed.

Doubtless there are other products that could be added, but this list includes the most important.

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